Offshore Wind Working Group

Friday, October 20th, 2017
9:00 a.m. to 12:00 p.m.
DNREC Auditorium
Richardson & Robbins Building
89 Kings Highway
Dover, DE 19904

DRAFT Meeting Minutes

Members present:
Bruce Burcat, Chair
Senator Harris McDowell
Representative Ronald Gray
Representative Trey Paradee
Robert Howatt, Public Service Commission Staff
Drew Slater, Public Advocate
Albert Shields, Governor's Policy Director
Mario Giovannini, Delmarva Power and Light
Mark Nielson, Delaware Electrical Cooperative
Dr. Jeremy Firestone, University of Delaware
Jeffery Gordon, American Birding Association
Collin O'Mara, National Wildlife Federation (by phone)

Members absent:
Patrick McCullar, Delaware Municipal Electric Corporation (DEMEC)
Senator David McBride
Jeff Bullock, Secretary of State
Shawn Garvin, Secretary, DNREC
Brenna Goggin, Delaware Nature Society
James Maravelias, Delaware State AFL-CIO
Guy Marcozzi, Duffield Associates

Designees present:
Doug Denison, designee for Secretary Bullock
Thomas Noyes, designee for Secretary Garvin
Scott Lynch, designee for DEMEC

Staff to the Working Group:
Thomas Noyes, DNREC Division of Energy & Climate

Working Group Chair Bruce Burcat opened the meeting at 9:08 a.m.

Administrative matters

The Working Group previewed the minutes from the October 6th, 2017 meeting. Senator McDowell asked that a statement be placed in the current minutes to clarify a statement that was attributed to him in the October 6th minutes:

> Statement: Before the Working Group does something that impacts rate base, historically and legally the Group is required to do a study to see if the new capacity is needed. We do not determine how much power Delaware needs: Delmarva Power and Lights files a report with projected power needs. New plants drive price increases more than any other factor. A study on the capacity needs in Delaware has not been done yet. Senator McDowell believes that if a study was completed, it would demonstrate that Delaware does not need new capacity, as the State is continuing to decrease demand.

The meeting minutes were approved.

Working Group members requested that any documents for the working group members to review for the meeting be sent at least 24 hours in advance of the meeting. This will ensure that the committee has enough time to read the materials provided. Documents that are provided by the working group will be posted on the Offshore Wind Working Group website: www.de.gov/offshorewind.

Stephanie McClellan has offered to come to the next meeting to talk about a study about the future costs of offshore wind for Massachusetts.

A glossary of acronyms was provided to the working group and posted on the website as requested by Senator McDowell.

DNREC has hired Synapse Energy Economics as a consultant to help with the offshore wind working group. Max Chang of Synapse participated in this meeting via phone.

Overview of Maryland offshore wind projects

The Working Group was briefed on Maryland's Offshore Renewable Energy Credits (ORECs). ORECs represent the energy and capacity and the REC value. A renewable energy credit represents one MWh of energy. The net OREC cost is the difference between what the OREC price set by the MD PSC and the price the companies can get for energy and capacity on the market. The OREC price is expressed in terms of the levelized cost of energy (LCOE), which is a useful tool for comparing different energy resources.

There are two projects under development in Maryland. The first, US Wind, was awarded the right to develop 248 MW off of Ocean City. US Wind started with a higher proposed price, but lowered its OREC price after Skipjack (developed by Deepwater Wind) applied for approval to develop 120 MW off of the Delaware coast at a lower price.

Drew Slater stated that the group has to be careful with the levelized cost of energy because it may not be accurate. Bloom Energy's LCOE was initially calculated at $1.30, but in 4 years became over $4.00. Bruce Burcat stated that the group will do future projections as well, including a reasonable inflation factor to analyze these costs.

Senator McDowell stated that it was necessary to compare offshore wind to the competing cost of onshore wind. The projections should consider that offshore wind is 3 times the cost of onshore wind energy. Dr. Firestone stated that there is a lot of uncertainty in projecting offshore wind costs, however there are ways to guard against these issues.

Bob Howatt stated that with Bluewater Wind, high natural gas prices were used as an assumption. Groups were saying "lock into prices now, because they are going to get higher." Ultimately these prices went down. Bruce Burcat reiterated that a benefit of renewable energy is that the prices can go down and the industry develops.

Senator McDowell stated that the current cost of offshore wind is $141/MWh, and this is only for 1% of the load. If you expand that cost to cover the rest of the load, you have a huge increase in price. Drew Slater stated that there's no utility in Delaware that is that high in price per kWh. The working group will

have to be extremely cautious as to not raise prices. Mr. Slater stated that he tries to equate this issue to the SREC auction costs. Based on the price provided by Senator McDowell, this project would not clear PJM's capacity market.

Mario Giovannini stated that at this price would, it have to be bid as seasonal capacity. In addition, we have to look at risk. Offshore wind only has a 40 percent capacity factor. What group would be willing to bear that risk with such a low capacity?

Dr. Firestone reminded the group that a lot of fossil fuels have only a 60% capacity**.** Senator McDowell stated that if a company wants to develop at their own risk, they can do so. The working group has to decide what is best for the rate payers in the state. The working group could ultimately make the decision that offshore wind is not in the best interest of Delaware at this time. Bruce Burcat mentioned that Maryland has a range of generation resources, with some being very low in price.

Projected wind power economics

Prices of offshore wind turbines have been coming down in part due to efficiencies and changes to the supply chain. The offshore wind group will need price projections going into the future (4-5 years). The group will also need to explore the implications of a tax changes. Europe cost trends are coming down significantly. The working group needs to capture that trajectory as much as possible. Mr. Noyes stated that the group will be doing an analysis on these costs

Supply chain and job opportunities

The Working Group discussed the USDOE 2016 Offshore Wind Technologies Market Report. Mr. Slater stated that he does not want the risk of offshore wind to fall on the ratepayers without a corresponding risk on the developers. Mr. Burcat said the risk is usually shared but it depends on where the Working Group wants this project to go and what risk tolerance we want the ratepayers to share. If ratepayers are to have zero risk, the working group can recommend that option, but prices may be high.

Mr. Howatt reminded the group that costs are only part of the equation and suggested the working group conduct a cost-benefit analysis based on the Executive Order's provision that the Working Group review the benefits of offshore wind as well as the costs.

Europe is ahead of the United States in offshore wind development. The price for offshore wind in Europe has gone from about $200/MWh to about $65/MWh. The price decrease is in part due to a maturing supply chain. A review by the University of Delaware projects offshore wind prices declining in Massachusetts. These projections (based on conversations with wind developers) show costs falling, but not yet as low as the prices in Europe.

Senator McDowell said that the United States Energy Information Administration (EIA) is the best source of information for pricing offshore wind. Prices are currently as follows:

14.6 cents/kWh for offshore
5.2 cents/kWh for onshore (national number)
6.7 cents/kWh for solar

Senator McDowell said the working group discussion should consider benefits of all zero carbon energy technologies. Dr. Firestone mentioned that these numbers are national, and we have to look at energy prices in our region. The working group has to ensure that numbers are put into context.

Mr. Slater stated the working group should look at all forms of renewable energy including out-of-state solar farms and onshore wind projects. If we buy renewable energy credits (RECs) from Pennsylvania, that helps Delaware's air quality. The working group also needs to talk about commercial and industrial costs including the inflators and the escalators broken down by class. The federal investment tax credits for wind and solar are currently scheduled to expire after 2021. He also said the working group should also consider impacts from the Jones Act, which could increase costs of offshore wind turbine installation until there is a U.S. based supply chain.

The Jones Act states that vessels going from one US port to another must be built in the US. If you travel from a US port to an offshore wind project, you would have to build a US vessel. If you have to bring a vessel over from Europe, it is extremely expensive. It currently takes 24 hours to get from Sparrow's Point to MD's offshore wind energy area.

Renewables and emissions

Mr. Noyes presented information from the PJM Renewable Integration Study of 2014 that found SOx and NOx emissions decline as renewable penetration increases. PJM calculated that increased cycling causes the reduction to be somewhat smaller, but does not eliminate the environmental impact of renewable energy resource.Dr. Firestone said we are in the era of storage, so we anticipate that emissions will decrease even more.

Mr. Noyes presented some information from a study by Dr. Willett Kempton looked at injecting wind power into Maryland and New Jersey that showed that public health experts calculated the public health benefits of cleaner air at $54 and $120 per MWh of generation benefit in health and climate benefits (respectively).

Dr. Firestone said the benefits of renewable energy regionally show that in the mid-Atlantic, renewables provides $143 per MWh in health and climate benefits. Health and climate benefits are equivalent to the $141/MWh costs the consumers would pay for offshore wind. Senator McDowell said that if the study is valid, the study applies to any zero carbon energy resources including nuclear, solar, and on shore wind. The working group can also use this study to look at nuclear and solar energy.

Mr. Burcat mentioned that other states have acknowledged the need for offshore wind, onshore wind, solar energy, and nuclear energy to go to 100 percent zero carbon energy. Jeremy Firestone stated that by having offshore wind in Delaware, we are also displacing fuels to the west of us, which blow pollutants into Delaware. Drew Slater stated that it might also help to join with Maryland and the states that are suing the western states for polluting our air.

Supply chain and job opportunities

Mr. Noyes presented data on projected offshore wind development jobs from the Governor's Wind Energy Coalition: 1.9 GW of capacity by 2020 would create 8,380 jobs. 7.8 GW of capacity by 2030 would create 31,630 jobs

Mr. Slater asked how many of these projected are full time jobs versus part-time or temporary jobs. Based on his discussions with Maryland, they expect 12-100 full time jobs from the proposed projects. Mr. Burcat, Mr. Slater, and Mr. Noyes agreed that FTEs (full time equivalents) are the best way to evaluate how many jobs will be created. Most of the job numbers from the Governor's Wind Energy

Coalition Report are for jobs in construction not operations. Bruce Burcat mentioned that there are also associated jobs that are continuous full time jobs in consulting and other areas after construction is complete.

Dr. Firestone commented that although the FTEs are important, we should also look at how we can expand in other parts of the supply chain, such as at the Port of Wilmington. There is the possibility that expansion of the Port could become a very important asset to the region due to its strategic location. Drew Slater stated that multiple states have been promised a "regional hub," so the group cannot assume that Delaware will get it.

Maryland Public Service Commission orders required specific commitments including skilled labor, workplace diversity**,** investment in steel fabrication and a MD Offshore Wind Business Development Fund.

Possible procurement scenarios

Mr. Noyes said the Working Group would be examining the question of what opportunities there are there for Deepwater and US to sell Delaware offshore wind, when and in what increments. He referred to maps of the MD and DE Wind Energy Area (WEA) and explained that U.S. Wind and Deepwater Wind are only going to use a portion of the Maryland and Delaware Wind Energy Areas to meet the obligations of the Maryland Public Service Commission.

Mr. Burcat mentioned that there were discussions that Bluewater Wind could sell power to New Jersey and asked if there could be a saturation issue with the coming change of administration in New Jersey and the state also becoming active in offshore wind. Bruce Burcat mentioned that one candidate for New Jersey Governor is talking about offshore wind projects in NJ.

Delaware would have an advantage would be that we could entertain proposals from two different companies that are selling to different states as well. Delaware might not have to go into a wind development project alone which would reduce project costs.

Mr. Howatt said Delaware could have an advantage of seeing lower electricity prices without having to install turbines because of the Maryland projects. The Maryland project will provide energy benefits to Delaware. Delaware could allow the whole Shipjack area to go to New Jersey and get additional energy benefits from the project without having to pay for the project. Bruce Burcat stated that Delaware would get price suppression effects from the MD projects.

The U.S. Wind project's power will come into Indian River Bay and connect to the substation by the coal power plant near Indian River. The substation can handle 1,200 MW of power. Deepwater Wind power would potentially go into Ocean City, based on proposals but that could change.

Albert Shields asked what the impacts are to Delaware of the transmission lines coming into Delaware. Mr. Noyes stated that if a substation is built in Delaware, it could likely involve Delaware electricians and businesses. In the longer term, it also helps to increase fuel diversity in Delaware, which in turn creates a better electricity market. Senator McDowell asked if we wouldn't we be shutting down a competing fuel source, like the Indian River coal plant. Mr. Noyes answered that we wouldn't; it would just diversify the grid.

Mr.Howatt stated that the Indian River connection has positives and negatives, but noted that Delaware has no say in this injection. The project would be using up a certain amount of Delmarva Power's capacity on the transmission lines.

Overview of the Renewable Energy Portfolio Standards Act (REPSA)

The Working Group discussed possible changes to the Renewable Energy Portfolio Standards Act (REPSA) that might be necessary to accommodate offshore wind. Tom Noyes presented two possible approaches to amending REPSA. One would be to use Offshore Renewable Energy Credits (ORECs) as in Maryland. It would be similar to the current set aside for solar power. Such an approach could involve setting price or cost impact limits.

Dr. Firestone asked if someone could provide historical REC prices that have been paid in DE. For example, what were Delaware ratepayers paying for SRECs (solar RECs)?

Mr. Slater asked if the RPS would be amended to include offshore wind, or would the group recommend just increasing the percentage requirement in the RPS. Mr. Burcat said either option is a possibility but there is no recommendation at this time. Mr. Slater recommended that the working group include the solar industry stakeholders in any discussion that involves amending the RPS.

Mr. Burcat stated that the working group has to be careful because the way the law is written right now, it could be a similar situation to Bloom Energy. Mark Nielson said the working group should recognize that for offshore wind the price of energy and capacity will have to be separate from the ORECs.

A second approach could be the recently expired REC multipliers provision that was introduced to the DE RPS for the 2008 for Bluewater Wind project. The REC multiplier allowed 1 MWh to generate 3.5 RECs. The impact of the multiplier that needs to be considered is it's an effective reduction in the number of RECs Delaware is buying.

Mr. Burcat said the multiplier made more sense in 2008 because the price of offshore wind was much higher so a larger incentive was needed. However, since then prices have come down dramatically. Mr. Burcat said he would hope that if we are looking at a REC multiplier, that it would be much lower than 3.5. Large REC multipliers defeat the environmental purpose of the RPS.

Mr. Howatt clarified that one of the reasons we had the REC multiplier was that the Bluewater Wind RECs would be marketable in other jurisdictions and Delaware ratepayers would not be buying all the RECs. The 2.5 extra RECs generated by the multiplier were going to be given to Bluewater Wind to sell in other jurisdictions. He said the solar industry currently has multipliers for Delaware labor and supply. He also said another party has filed suit with the World Trade Organization saying that material multipliers have created a discriminatory market practice. The working group has to be careful that this process does not introduce discriminatory practices. Mr. Noyes said the 10 percent solar multiplier for supply is currently a moot point because Delaware has no manufacturers. Mr. Noyes and Mr. Slater said the working group should keep in mind that there are other potential approaches and the working group currently has no recommendations or preconceived notions. The group should look at what other states have done.

Schedule and agenda going forward

Future meeting have been scheduled for:

November 1: 9am- noon, PSC Hearing Room
November 15: 1-4pm, location TBD
November 29: 9am -12pm, PSC Hearing Room
December 11: 1-4pm, PSC Hearing Room

There will also be two public workshops, and the dates will be decided soon.

Mr. Noyes explained that in the next meetings, the Working Group is going to be looking at what opportunities the two Maryland projects present in Delaware and what the timing looks like for these projects. The group will also be getting some specific numbers on price projections from Delmarva.

At the next meeting (November 1st), Stephanie McClellan, from the Special Imitative for Offshore Wind, will give details on where the offshore wind industry is going, Willett Kempton will present on industrializing the offshore wind industry, and the Working Group will discuss how the group can project benefits of offshore wind energy in terms of reduced emissions.

Working Group members suggest some questions from the working group members for DNREC and the consultant. Mr.Howatt mentioned that the group should also consider a joint Power Purchase Agreement (PPA) with Delmarva, DEC, and DEMEC. This could potentially be the cheapest and most direct way to purchase offshore wind power. Mr. Giovannini stated Delmarva would be against a PPA. ORECs would be preferred by DPL in order to spread risk across several groups. Scott Lynch and Mark Nielson said DEMEC and DEC would be concerned with the legal issues around a PPA.

Senator McDowell stated that another option is to let Maryland do their project and wait to see what happens. Representative Paradee asked if there were any offshore wind developers who are interested in developing in the Delaware WEA. If there are, he would be interested in hearing directly from the developers and asking them what they want and what they need from the Working Group. Right now it seems as if the group could be creating a product without understanding the customer's needs. The Working Group's work is being done without knowing what the developers are looking for and what their needs are so the group could end up recommending a package that is too rich and burdens the ratepayers. Or the group might develop a product that ends up turning away developers.

Mr. Burcat said the group wanted to use developers as more of a resource, not as a deciding factor for the group. Mr. Noyes stated that U.S. Wind and Deepwater have both expressed interest in developing offshore wind in Delaware. Members of the Working Group said they would like to hear from the developers at future meetings but there are concerns about inviting specific companies. Mr. Howatt also mentioned that the group should know what some of these developers are interested in, but that since this is a public working group, we may not want to have private companies come in to talk.

Mr. Slater also brought up that we still need to talk about avian and mammal issues. Dr. Firestone reminded the group that the offshore wind sites will be required to comply with NEPA and federal regulations. In addition, when talking about environmental impacts, we have to compare them to the impacts from fossil fuels on the environment. He also said that he would like to still hear more about the MD process. If they had a two year stakeholder process, maybe the working group can learn some things from them.

Mr. Giovannini asked if the working group had heard from the project developers from US Wind or Shipjack regarding siting because he was interested in knowing where in the Wind Energy Areas the projects were being built. Jeremy Firestone said that the closet spot for the wind energy area in MD is 11

miles offshore. The Maryland PSC wanted to have the project move further from shore. Skipjack will be located at the more southern portion of the Delaware Wind Energy Area.

Mr. Slater also mentioned that the working group needs to figure out public comment sessions soon, because there needs to be a 20 day notice. The group decided that there will be two meetings, with one held in Sussex County (near the beaches) and the other held in New Castle County (possibly at the Middletown High School). Rep. Gray offered to call his contacts at Indian River High School for the Sussex County meeting.

Mr. Nielson had questions about the capacity factor of the offshore wind turbines and would like to see data on this. Dr. Firestone mentioned that the University of Delaware has two people who study offshore wind meteorology. He will invite them (along with PJM) to a meeting if the working group desires.

Public comment

The working group heard from four members of the public.

Michael Messer of Linde, LLC had two requests from the working group: Ensure that evaluation of impacts include industrial consumer class. He said that Linde LLC pays over $1 million a year in Bloom surcharges. Second, he said that consumer protections should be built in. In terms of capacity, he said only 13% of nameplate can be put into auction.

Dave Stevenson of the Caesar Rodney Institute stated that the offshore wind working group should not look at externality cost benefits, stating that offshore wind will replace offshore wind, and therefore the impact will be the same. He also mentioned that the contractor (Synapse) is using out of date methodology from the EPA. The discount factor should be 7%, not 3% as the EPA claims. Offshore wind is always going to be more expensive. As an example, if you look at offshore oil rigs, which have been around for decades, the price has remained expensive compared to land-based oil drilling, even as the facilities have matured.

Jay Fuess, a consultant also expressed concern over additional costs being imposed on large energy users and agreed with Michael Messer's statements.

John Nichols asked to show some slides of greenhouse gas emissions over time. He said that greenhouse gas emissions were increasing despite the growth of wind power.

The meeting was adjourned at 11:54 a.m.